Listing of All Claims Including Current Amendments

1. (currently amended) A method for detecting an impurity in a sample having at least one analyte comprising the steps of:

obtaining characteristic measurements of the sample;

selecting a value representing an anticipated number of components in the sample;

generating a matrix representing said characteristic measurements for the sample, said characteristic measurements having at least two variables in each dimension;

repeatedly selecting a subset within said matrix for analysis of the relation between the analyte and impurity;

constructing a projection matrix by projecting each of the characteristic measurements onto said subset to calculate a residual error; and

calculating an index from said subset to assess purity of the sample.

2. (original) The method of claim 1 wherein said index represents a purity index.

3. (original) The method of claim 1 wherein said index represents an impurity index.

4. (original) The method of claim 1 wherein said characteristic measurements contain a baseline component.

5. (original) The method of claim 1 wherein said characteristic measurements do not contain a baseline component.

6. (original) The method of claim 1 wherein said characteristic measurements are spectra associated with a chromatographic peak.

7. (original) The method of claim 3 wherein said impurity index is represented as E and calculated according to the equation:

$$E = \sqrt{\frac{\mathbf{e}^{\mathrm{T}}\mathbf{e}}{n - r_0 - r_1}}$$

8. (original) The method of claim 6 wherein said matrix is dimensioned with data representing retention times for the chromatographic peak and wavelengths for the spectra.

9. Cancelled.

10. (currently amended) The method of claim ~~9~~ 1 further comprising the step of calculating said residual error represented by $\mathbf{e}$ according to the equation:

$$\mathbf{e} = (\mathbf{I} - \mathbf{P}_0)\mathbf{r}$$

11. The method of claim 1 wherein said subset is represented by a sub-matrix $\mathbf{R}_j$ having values which can be decomposed into the expression:

$$\mathbf{R}_j = \mathbf{U}_j \mathbf{S}_j \mathbf{V}_j^{\mathrm{T}}$$

12. The method of claim 2 wherein said purity index is represented by k_j and is calculated from $\mathbf{S}_j$ according to the equation:

$$k_j = \frac{\sum_{i=1}^{r_0+r_1} s_i}{s_r}$$